

Cross-Cascades Corridor Analysis Project
Notes from Peer Review Panel Meeting

Friday, June 1, 2001
PSRC Board Room – Seattle

Peer Review Panel: Dr. Deb Neimeier, University of California at Davis, and Keith Lawton, Director of Travel Demand Forecasting, Portland Metro

Attendees: Charlie Howard, WSDOT; Todd Carlson, WSDOT; Miguel Gavino, WSDOT; Larry Blain, PSRC; Doug Hunt, Hunt Analytics, Inc. John Abraham, Hunt Analytics, Inc.; Tara Weidner, HDR; Ed Hayes, Spokane Regional Transportation Council (SRTC); Rob Bernstein, TranSystems; Jin Ren, Thurston Regional Planning Council (TRPC); Steve Smith, Washington State Dept of Revenue; Mushtaq Rahman, City of Bellevue; Faris Al-Memar, WSDOT; Celine Gihring, Washington State Ferries; John Dewhurst, Snohomish County Public Works; Judy Clark, CH2Mhill; Johannes Kurz, Snohomish County Public Works; Robert Shull, TModel Corp.; Youssef Dehghani, Parsons Brinckerhoff; Robert Sicko, Mirai Associates; Gary Costa, City of Issaquah; Elaine Murakami, FHWA; Robert Tung, RST International; Sean Wellander, King County; Bill Bennett, WSDOT; Craig Helmann, WSDOT; Ralph Wilhemi, WSDOT; Bill Osterhout, WSDOT; Courtney Knox, Berk & Associates; Mark Ford, HDR; Nancy Boyd, WSDOT; Sorin Garber, HDR; Roger Johnson, HDR

***Objective** – To provide an independent critical assessment of the model approach, data, analytic methods and assumptions being advanced by the consultant team for the development of an interregional travel forecasting tool. In addition to evaluating the architecture, capabilities, and data needs of the model, the Peer Reviewers will assess the proposed outputs, scenarios, and overall usage of the Cross Cascades Corridor model, and will be asked to provide guidance on the next steps of the model development process.*

Notes from the Workshop:

Welcome and Introductions

Faris Al-Memar opened the meeting by welcoming Peer Review Panel members and acknowledging the participation from MPO partners and WSDOT staff, which was instrumental in bringing the model to this point.

Purpose of the Peer Review Session

Sorin Garber provided an overview of the Peer Review Panel meeting. The main purpose of the meeting is to review model accomplishments to-date, gather feedback on model development, establish priorities for future model development, and document Peer Review Panel comments. There will also be opportunity for discussion. Sorin reviewed the agenda and objectives for the meeting, asked participants to introduce themselves, and introduced the Peer Review Panel members, Dr. Deb Neimeier and Keith Lawton.

Study Background and Context

Mark Ford reviewed the project's purpose, the model criteria and selection process, and the model development timeline. Mark reviewed the description of the Cross-Cascades Corridor, which covers the area from Seattle to Spokane and is primarily concerned with travel on SR-2 and I-90, as well as Stampede Pass, Stevens Pass, and air and other passenger service and freight routes inside the corridor.

Originally, the project was intended to develop a forecast tool to analyze travel demand and result in a corridor development plan, becoming a template for use in statewide corridor analysis. The project has evolved away from development of a corridor plan to the development of a corridor analysis methodology. Given this purpose, model criteria were developed to select the most appropriate forecast approach and forecast tool. Mark reviewed the model criteria and the approaches that were considered.

The Spatial I-O was selected because it met the model criteria and has several advantages over the other approaches. The Spatial I-O model:

- incorporates land use and economic data,
- allows for testing of policy options,
- is dynamic – outcomes of each three-year cycle feed into next three-year cycle,
- is expandable and transferable (to other corridors and for statewide purposes,
- uses data from a variety of other sources, and
- could be developed (in a rudimentary fashion) in 12 weeks.

Mark provided a brief overview of model development progress to-date. The team is at the point of calibrating model and will have tested several scenarios by the end of June.

Question 1: The Model Structure

Doug Hunt provided an overview of the theoretical construction of the model, its design, and the way MEPLAN software works. The model is designed to express the way the economy works. It captures production and consumption from different components of the economy in different areas, the transportation demands that arise from this activity, and where the activity is occurring. As demand for transportation arises, goods/services and household-related transport flows are loaded into the network. The costs of moving goods feed back and influence the economic structure.

Doug described the basic model components and their interactions in the “Hunt Diagram”. The Land Use Model describes the relationship between the consumption and production factors. The Transport Model describes the mode and purpose of travel, network flows and links. These load onto the different components of the network. Congestion in the network produces costs, which influence the distribution of goods and services and the cost of doing business. The Interface Model allows for the interaction between the land use and transport models. Costs feed into the model and influence the next three-year period, allowing land use decisions to be based on the transportation disutilities (or costs) of the last cycle. The Spatial I-O Model is a combination of the

Land Use Model, the Transport Model and the Interface Model operating between the two. Doug then briefly reviewed a diagram of the MEPLAN software's overall structure, including land use and transport sub models. The evaluation subsystem has not been used to-date.

Land Use Model

Tara Weidner reviewed the land use and economic data inputs to the Land Use Model. Tara explained that the base year is constrained by existing conditions and is based on current LMEA statistics for Washington. She provided an overview of the structure of the land use model, describing the industry groups, household income group zones, and economic coefficients used as inputs to the model. Although the focus is on the corridor, information for the state as a whole and several zones outside the state was also used to accurately represent external influences on activity inside the corridor.

To represent trade flows, the team relied on the IMPLAN I-O matrix and converted trade flow dollars to employees and households for use in the model. State-specific coefficients were used. Growth in exogenous production after the base year is assumed to match statewide growth. A question was raised about exogenous production and the allocation of high technology employment. Tara stated that high tech employment is spread throughout different industry categories and is difficult to capture. A question was also raised about the size of the sparsely populated zones in the center and it was suggested that, in future phases of the modeling effort, more zones should be added.

Transport Model

Tara reviewed the flow types and user modes, passenger and freight rates, and transportation networks captured in the model. She explained that the flow type categories are based on NPTS categories. Breaks in mode split tended to fall along categories used in Reebie data.

Tara briefly reviewed the passenger fares and freight fares. The passenger fare cost function by mode is based on a constant value and a variable rate of distance per passenger mile. Freight fares were based on a WSDOT report of rail and truck competition. Deb Neimeier noted that the minimum value was not necessary for passenger airfares. Keith Lawton suggested that the team consider changing the personal value of time by income group.

Peer Review Panel members expressed some interest in expanding the model's treatment of transportation networks. Deb suggested that the model include some additional airports outside of the corridor that could have an impact on the system. Keith suggested that the model should work to estimate some measure of rail capacity.

Interface Model

Tara covered the Interface Model's treatment of user modes, connections or node/link types, trip rates, and vehicle loads. Trade-to-trip ratios were used to develop rates, and were based on NPTS travel data and Reebie freight data. Peer Review Panel members expressed some concern regarding the high volumes on the links. Deb suggested that trip rates by income category vary greatly and volumes could be inflated by giving everyone the same trip rates. The NPTS data for weekends was offered as another data source for incorporation in the model. Keith suggested that the income groupings be reconfigured along the lines of where changes in behavior are occurring. Tara reviewed conversion factors for vehicle loads by flow type, which were based on Reebie data and scaled from light to heavy weights. Vehicle occupancy values were derived from PSRC data. One suggestion for decreasing volumes was to check the persons per vehicle value for shopping with the most recent PSRC household survey.

Overall, Peer Review Panel members concurred with the choice of Spatial I-O for the model structure. Keith reiterated his concern regarding the apparently high volumes for trip rates. He noted that the model should attempt to capture the interchange that occurs between the Cross-Cascades Corridor and the Columbia River Corridor when capacity is constrained or weather impedes travel on one corridor. Deb noted that the passenger travel categories imply a resolution that the model does not appear to have and that the zones are fairly coarse. Deb asked for clarification regarding the choice of the three-year increment for the model. WSDOT was required to meet 6 and 20 year forecast parameters. The three-year increment period was used to reach these goals, and because that interval period allows for calibration of 1998 and 2001 data.

Question 2: Calibration and Model Outputs

John Abraham provided an overview of calibration of the model and the data sources used to determine whether the model accurately represents travel demand patterns. He reviewed the data sources used to produce targets for person trips and freight flows in the Cross-Cascades Corridor. To prioritize one parameter or a set of parameters, these targets can be weighted.

John explained that the team is currently adjusting the parameter values to fit a set of targets for the corridor. Once completed, the team will run several scenarios to demonstrate the types of output the model will be able to produce. Tara displayed several examples of output, mapped in ArcView, describing network loads now and in the future, the location of expected employment and household growth, and charts identifying current segment loads in the corridor. Maps do not exhibit specific facilities but reflect the composite values for facilities in the vicinity.

The discussion was opened to comments regarding calibration and the demonstration of the model outputs. Miguel Gavino asked whether growth management boundaries could be introduced into the model. There are several methods for introducing these boundaries in future phases of the model. Larry Blaine pointed out that random allocation of growth

should be constrained for future demonstrations to mask growth in forested areas and other areas where growth is not possible. Miguel asked whether the model could show how much each zone or county contributes to the total. An origin-destination table could be produced.

Keith expressed concern that the model is focused too narrowly on the corridor and may not adequately explain statewide growth, north-south flows, or the Portland-Vancouver metro area. Deb asked for clarification regarding the sensitivity of factors and the testing for “goodness-of-fit”. Doug mentioned that there are some expected order-of-magnitude values for different parameters. There is no single, unique, objective measure. Specific targets can be tested for goodness-of-fit. Due to the integrated nature of the model, calibrating the model to one target may result in a change in another target’s accuracy. Weighting of the targets is designed to avoid this problem but requires additional policy guidance. Deb stated that the weighting procedure should be documented.

Question 3: Future Scenarios

Sorin outlined the scenarios that the team is considering as a method for demonstrating what the model is capable of producing. The model is intended to help measure the effects of events and policy decisions on the system. Sorin asked Peer Review Panel members to discuss their impressions, concerns, and suggestions regarding scenario development.

Keith suggested that changes in exogenous demand in Eastern Washington may shift demand around, impacting the state economy and changes in the transport patterns. Deb suggested that the scenarios be informed by policy objectives in the WTP. She also felt that the scenarios should help improve the model, be used to increase the understanding of it at this stage, and to test whether results meet expectations.

Other scenario suggestions included:

- Transportation system improvements – test improvements (such as change in travel time or speed or number of lanes) to either SR-2 or I-90 and the impact of change on the other route
- Impact of changes in market for short-haul intermodal rail on truck volumes and congestion over passes
- Test historical data – Rebbie data was suggested as a possible source for historical data
- Impact of a significant change in employer base
- Adjust temporal distribution of flows during the day or changes in weekday/weekend traffic volumes– in future iterations of the model
- Should there be a center in the middle of the corridor?
- Changes in our economy and society – such as changes in technology of production
- Test a concentration of policy efforts or a visioning exercise
- The collapse of all or some of the system in a major earthquake
- Impact of development of industry outside of Puget Sound

Question 4: Priorities for Future Model Development/Next Steps

Mark asked the Peer Review Panel to comment on steps to improve the model in its future iterations. Overall, the Peer Review Panel stated that the model development effort has provided a sound foundation and that the work to-date is a good, first step. Peer Review Panel members were asked to suggest and prioritize next steps for model development.

Keith Lawton suggested that to improve the model the team should:

- Deal with the north-south flows
- Develop more acuity in the system
- Input land pricing data (floor space)
- Widen the area of study (perhaps including some data for Oregon)
- Increase the number of zones
- After one or two additional iterations at the statewide level, consider some of the advantages of micro-simulation for some elements

Deb Neimeier agreed with Keith regarding the need for north south flows and suggested that the team improve the model by providing:

- increased resolution of zonal structure
- resolution of concerns regarding appearance of no growth in Spokane and low growth in Vancouver in model output
- documentation of model development
- documentation of parameters, their sensitivity and level of uncertainty

Other Remarks

Members of the Model Development Interest Group and others in the audience asked additional questions and offered suggestions for improvements to the model:

- *Will land use and pricing data be added into the model?*
This data is important to future iterations of the model. Keith suggested that integration of land pricing into the model should be a priority. However, he cautioned that there are several data collection implications to consider when collecting floor space data. Steve Smith stated that there are 39 separate systems of data collection in Washington, conducted by each county's assessor. Additional data issues include: assessor data will not encompass tax exempt facilities, accurate data for mixed-use buildings may be difficult to capture through an aerial survey, and that records at building departments may differ from lease-able space.

Reports on land capacity inventory for Spokane and the four Puget Sound counties should be out at the end of 2001. Larry mentioned that the PSRC is interested in working with its members to improve the quality of the assessor data. The City of Bellevue has its own square footage tracking system. Metro Scan databases were offered as a good data source for several Seattle zones.

- *Is integration of the Oregon and Washington model being considered at this time?*
Oregon modeled several areas in Washington in order to improve the model's accuracy. This type of an integrated model would be possible technically, but political issues could impede progress.
- *Where are we in the project and what level of comfort do we have in the model at this point?*
Nancy pointed out that the model development work has gone beyond everyone's expectations. Phase I work is being completed now – including calibration; analysis of some scenarios to demonstrate the potential of the model; the types of questions that the model will be able to answer; and what the results could look like.

Miguel suggested that documentation and future presentations of the model acknowledge the requirements of some tasks (i.e. estimates of floor space could take two years) to manage expectations of the model. Rob Bernstein suggested use of the term “testing” rather than “demonstration” of the model.

Deb offered several key questions that the team could answer to avoid overselling what the model can produce: (1) Determine how far do you want to go on this path – pursue the floor space model or land capacity proxy? (2) At what point do you have confidence in what it produces? She suggested that the team develop an implementation strategy containing a list of model improvements, the steps and data collection required to complete the improvement and an example of the type question the improvement would allow the model to answer. Miguel offered the PSRC model update work as an example.

For policy makers, Todd Carlson suggested that the documentation of the effort should:

- Explain why spatial I/O is the best method for this work
 - Describe the value of the result – the sound base for a model that could be used to evaluate future investment choices
 - Identify clearly and explain steps to make the model operational, the purpose of each step, and the increment of funding that each step would require.
- *What are the next steps?*
Next week, the team will be briefing the RTPO/MPO Coordinating Committee. A conversation with the Transportation Commission will be scheduled to demonstrate the work that has been completed and the potential of the model. Sorin added that the effort to document the model development work, both electronically and interactively, is currently underway. The next step in the model development will be to conduct alternatives analyses. In June, there will be a training workshop to inform WSDOT staff and the Model Development Interest Group on the inner workings of the model.

Additional specific suggestions for future model improvements included incorporation of:

- Seasonality of motor vehicle user costs
- Statewide data collection effort for multi-modal passengers – origin-destination study such as the work EWITS has done for freight and by the WSF for incorporation to the model structure. Cross-Sound communities, such as Kitsap County, should also be considered for additional data collection

Requests for information:

- Todd requested speaking points and a presentation-level document be developed for early July.
- Larry asked that the calibration procedures and tools used for conducting calibration be part of the training, documentation and the products delivered.

Wrap Up

The team summarized the priority next steps for model development. The Panel reiterated that they would like to be reasonably sure about trip links, trip rates and economic distribution data. The level of certainty for each of the parameters should be documented with clear steps outlined for future iterations of model development. Larry suggested that the wrap up effort should clearly identify the questions that the model can help to answer and the quality of the answers at this point.

Peer Review Panel members will formally document their comments on the model development, in general, and their responses to the four questions